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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Blais *et al.* Confirmation No.: 1928
Serial No.: 10/801,340 Art Unit: 2811
Filed: March 15, 2004 Examiner: To be assigned
For: RESONANT CONTROLLED Attorney Docket No.: 706700-999187
QUBIT SYSTEM

INFORMATION DISCLOSURE STATEMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the duty of disclosure provisions of 37 C.F.R. §1.56, there is hereby provided certain information which the Examiner may consider material to the examination of the subject U.S. patent application. It is requested that the Examiner make this information of record if it is deemed material to the examination of the application.

1. Enclosures accompanying this Information Disclosure Statement are:

- 1a. ☒ A list of all patents, publications, applications, or other information submitted for consideration by the office.
- 1b. A legible copy of:
- ☒ Each U.S. patent application publication and U.S. and foreign patent; **copies of U.S. patents and U.S. patent application publications have not been enclosed, since the U.S. Patent and Trademark Office has waived the requirement under 37 CFR 1.98 (a)(2)(i) for submitting a copy of each cited U.S. patent and U.S. patent application publication for all U.S. patent applications filed after June 30, 2003.**
 - ☒ Each publication or that portion which caused it to be listed on the PTO-1449.
 - ☒ For each cited pending U.S. application, the application specification including the claims, and any drawing of the application, or portion of the application which caused it to be listed on the PTO-1449 including any claims directed to that portion; **however, copies of references AN-AQ have not been submitted since reference AN is the parent of the subject application. References AO, AP and AQ are continuations of the parent application. As such, references AN-AQ and the instant application have identical specifications.**
 - ☒ all other information or portion which caused it to be listed on the PTO-1449.
- 1c. ☐ An English language copy of search report(s) from a counterpart foreign application or PCT International Search Report.
- 1d. ☐ Explanations of relevancy (ATTACHMENT 1(d), hereto) or English language

abstracts of the non-English language publications.

2. ☒ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(b):
☐ Within three months of the filing date of a national application other than a continued prosecution application under §1.53(d);
☐ Within three months of the date of entry of the national stage as set forth in §1.491 in an international application;
☒ Before the mailing of the first Office action on the merits;
☐ Before the mailing of a first Office action after the filing of a request for continued examination under §1.114.
3. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(c) after the period specified in 37 C.F.R. §1.97(b), but before the mailing date of any of a final action under 37 C.F.R. §1.113, a notice of allowance under 37 C.F.R. §1.311 or an action that otherwise closes prosecution in the application.

(Check either Item 3a or 3b)

- 3a. ☐ The Certification Statement in Item 5 below is applicable. Accordingly, no fee is required.
- 3b. ☐ The \$180.00 fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is:
☐ enclosed
☐ to be charged to Jones Day Deposit Account No. 50-3013, referencing CAM No. 706700-999147.

(Item 3b to be checked if any reference known for more than 3 months)

4. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(d) after the period specified in 37 C.F.R. §1.97(c), but on or before the date of payment of the issue fee.

The Certification Statement in Item 5 below is applicable.

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5. ☐ Certification Statement (applicable if Item 3a or Item 4 is checked)

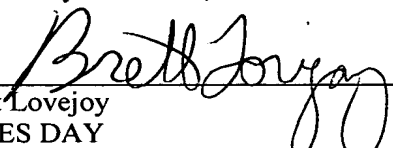
(Check either Item 5a or 5b)

- 5a. ☐ In accordance with 37 C.F.R. §1.97(e)(1), it is certified that each item of information contained in this Information Disclosure Statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Information Disclosure Statement.
- 5b. ☐ Each item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not **received** by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of this information disclosure statement.

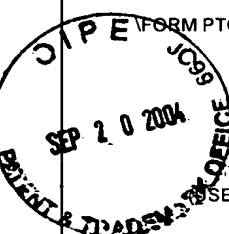
- 5c. ☐ Pursuant to 37 C.F.R. §1.704(d), each item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not **received** by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of this information disclosure statement.
6. ☐ This application is a continuation application under 37 C.F.R. §1.60 or §1.53(b) or (d).
- (Check appropriate Items 6a, 6b and/or 6c)*
- 6a. ☐ A Petition to Withdraw from issue under 37 C.F.R. §1.313(b)(5) is concurrently filed herewith.
- 6b. ☐ Copies of publications listed on Form PTO-1449 from prior application Serial No. _____, filed on _____, of which this application claims priority under 35 U.S.C. §120, are not being submitted pursuant to 37 C.F.R. §1.98(d).
- 6c. ☐ Copies of the publications listed on Form PTO-1449 were not previously cited in prior application Serial No. _____, filed on _____, and are provided herewith.
7. ☐ This is a Supplemental Information Disclosure Statement. (Check Item 7a)
- 7a. ☐ This Supplemental Information Disclosure Statement under 37 C.F.R. §1.97(f) supplements the Information Disclosure Statement filed on _____. A bona fide attempt was made to comply with 37 C.F.R. §1.98, but inadvertent omissions were made. These omissions have been corrected herein. Accordingly, additional time is requested so that this Supplemental Information Disclosure Statement can be considered as if properly filed on _____.
8. ☒ The Commissioner is authorized to charge any additional fee required or credit any overpayment for this Information Disclosure Statement and/or Petition to Jones Day Deposit Account No. 50-3013.
9. ☒ No admission is made that the information cited in this Statement is, or is considered to be, material to patentability nor a representation that a search has been made (other than a search report of a foreign counterpart application or PCT International Search Report if submitted herewith). 37 C.F.R. §§1.97(g) and (h).

Respectfully submitted,

Date: September 20, 2004


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(Reg. No.)

 FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE LIST OF REFERENCES CITED BY APPLICANT USE SEVERAL SHEETS IF NECESSARY	ATTY. DOCKET NO. 706700-999187 (Formerly 11090-073-999)	APPLICATION NO. 10/801,340
	APPLICANT Blais et al.	
	FILING DATE March 15, 2004	GROUP 2811

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE (IF APPROPRIATE)
	AA	US 5,917,322	06/1999	Gershenfeld et al.	324	307	10/08/1996
	AB	US 6,128,764	10/2000	Gottesman	714	785	02/06/1998
	AC	US 6,317,766	11/2001	Grover	708	400	11/02/1998
	AD	US 6,459,097 B1	10/2002	Zagoskin	257	31	01/07/2000
	AE	US 6,504,172 B2	01/2003	Zagoskin et al.	257	14	03/16/2001
	AF	US 6,563,311 B2	05/2003	Zagoskin	324	248	05/14/2001
	AG	US 6,605,822 B1	08/2003	Blais et al.	257	34	04/12/2002
	AH	US 6,670,630	12/2003	Blais et al.	257	33	
	AI	US 6,614,047 B2	09/2003	Tzalenchuk et al.	257	34	12/17/2001
	AJ	US 2002/0188578 A1	12/2002	Amin et al.	706	15	06/01/2001
	AK	US 2003/0193097 A1	10/2003	Il'ichev et al.	257	E27	04/26/2002
	AL	US 2003/0224944 A1	12/2003	Il'ichev et al.	505	170	12/16/2002
	AM	US 2004/0012407	01/2004	Amin et al.	326	3	
	AN	10/419,024		Blais et al.			04/17/2003
	AO	10/798,737		Blais et al.			03/10/2004
	AP	10/801,335		Blais et al.			03/15/2004
	AQ	10/801,336		Blais et al.			03/15/2004
	AR	60/341,974		Il'ichev et al.			12/18/2001
	AS	60/349,663		Amin et al.			01/15/2002
	AT	60/372,958		Il'ichev et al.			04/15/2002
	AU	60/556,778		Hilton et al.			03/26/2004
	AV	60/557,747		Amin et al.			03/29/2004
	AW	60/557,750		Grajcar et al.			03/29/2004

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO

EXAMINER

DATE CONSIDERED

*EXAMINER: INITIAL IF CITATION CONSIDERED, WHETHER OR NOT CITATION IS IN CONFORMANCE WITH MPEP 609; DRAW LINE THROUGH CITATION IF NOT IN CONFORMANCE AND NOT CONSIDERED, INCLUDE COPY OF THIS FORM WITH NEXT COMMUNICATION TO APPLICANT.

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE LIST OF REFERENCES CITED BY APPLICANT (USE SEVERAL SHEETS IF NECESSARY)	ATTY. DOCKET NO. 706700-999187 (Formerly 11090-073-999)	APPLICATION NO. 10/801,340
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EXAMINER INITIAL	OTHER DOCUMENTS (INCLUDING AUTHOR, TITLE, DATE, PERTINENT PAGES, ETC.)	
AX	W.A. Al-Saidi and D. Stroud, "Eigenstates of a small Josephson junction coupled to a resonant cavity", Physical Review B, 65, pp. 014512-1 to 014512-7 (2001).	
AY	A.D. Armour, M.P. Blencowe, and K.C. Schwab, "Entanglement and Decoherence of a Micromechanical Resonator via Coupling to a Cooper-Pair Box", Physical Review Letters, 88, pp. 148304-1 to 148301-4 (2002).	
AZ	A. Barenco, C.H. Bennet, R. Cleve, D.P. DiVincenzo, N. Margolus, P. Shor, T. Sleator, J.A. Smolin, and H. Weinfurter, "Elementary gates for quantum computation", Physical Review A, 52, pp. 3457-3467 (1995).	
BA	A. Blais, "Quantum network optimization", Physical Review A, 64, pp. 022312-1 to 022312-5 (2001).	
BB	G. Blatter, V.B. Geshkenbein, and L. Ioffe, "Design aspects of superconducting-phase quantum bits," Physical Review B, 63, pp. 174511-1 to 174511-9 (2001).	
BC	D. Born, T. Wagner, W. Krech, U. Hubner, and L. Fritzsche, "Fabrication of ultrasmall tunnel junctions by electron beam direct-writing", IEEE Transactions on Applied Superconductivity, 11, pp. 373-376 (2001).	
BD	O. Buisson and F.W.J. Hekking, "Entangled states in a Josephson charge qubit coupled to a superconducting resonator", arXiv.org:cond-mat/0008275 (2000), website last accessed on June 4, 2004.	
BE	A. Cottet, D. Vion, A. Aassime, P. Joyez, D. Esteve, and M.H. Devoret, "Implementation of a combined charge-phase quantum bit in a superconducting circuit", Physica C, 367, pp. 197-203 (2002).	
BF	D. Deutsch, "Quantum theory, the Church-Turing principle and the universal quantum computer", Proceedings of the Royal Society of London A, 400, pp. 97-115 (1985).	
BG	D.P. DiVincenzo, "The physical implementation of quantum computation", arXiv.org:quant-ph/0002077 (2000), website last accessed on June 4, 2004.	
BH	Economist, "Quantum Dreams", pp. 1-3 (March 8, 2001).	
BI	R.P. Feynman, "Simulating physics with computers", International Journal of Theoretical Physics, 21, pp. 467-488 (1982).	
BJ	J.R. Friedman, V. Patel, W. Chen, S.K. Tolpygo, and J.E. Lukens, "Quantum superposition of distinct macroscopic states", Nature, 406, pp. 43-46 (2000).	
BK	L.K. Grover, "A fast quantum mechanical algorithm for database search", Proceedings of the 28th STOC, pp. 212-219 (1996).	
BL	S. Han, Y. Yu, X. Chu, S.-I. Chu, and Z. Wang, "Time-resolved measurement of dissipation-induced decoherence in a Josephson junction", Science, 293, pp. 1457-1459 (2001).	
BM	F.W.J. Hekking, O. Buisson, F. Balestro, and M.G. Vergniory, "Cooper Pair Box Coupled To a Current-Biased Josephson Junction", arXiv.org:cond-mat/0201284 (2002), website last accessed on June 4, 2004.	
BN	X. Hu, R. de Sousa, and S. Das Sarma, "Decoherence and dephasing in spin-based solid state quantum computers", arXiv.org:cond-mat/0108339 (2001), website last accessed on June 4, 2004.	
BO	P. Joyez, P. Lafarge, A. Filipe, D. Esteve, and M.H. Devoret, "Observation of parity-induced suppression of Josephson tunneling in the superconducting single electron transistor", Physical Review Letters, 72, pp. 2458-2462 (1994).	
BP	A.J. Leggett, S. Chakravarty, A.T. Dorsey, M.P.A. Fisher, A. Garg, W. Zwerger, "Dynamics of the dissipative two-state system", Reviews of Modern Physics, 59, pp. 1-85 (1987).	
BQ	Yu. Makhlin, G. Schön, and A. Shnirman, "Quantum-state engineering with Josephson-junction devices", Reviews of Modern Physics, 73, pp. 357-400 (2001).	

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BR	F. Marquardt and C. Bruder, "Superposition of two mesoscopically distinct quantum states: Coupling a Cooper-pair box to a large superconducting island", <i>Physical Review B</i> , 63, pp. 054514-054520 (2001).	
BS	J. Martinis, S. Nam, J. Aumentado, and C. Urbina, "Rabi Oscillations in a Large Josephson-Junction Qubit", <i>Physical Review Letters</i> , 89, pp. 117901-117904 (2002).	
BT	J.E. Mooij, T.P. Orlando, L. Levitov, L. Tian, C.H. van der Wal, and S. Lloyd, "Josephson persistent-current qubit", <i>Science</i> 285, pp. 1036-1039 (1999).	
BU	Y. Nakamura, Yu.A. Pashkin, and J.S. Tsai, "Coherent control of macroscopic quantum states in a single-Cooper-pair box", <i>Nature</i> , 398, pp. 786-788 (1999).	
BV	T.P. Orlando, J.E. Mooij, L. Tian, C.H. van der Wal, L.S. Levitov, S. Lloyd, and J.J. Mazo, "Superconducting persistent-current qubit", <i>Physical Review B</i> , 60, pp. 15398-15413 (1999).	
BW	F. Plastina and G. Falci, "Communicating Josephson qubits", arXiv.org:cond-mat/0206586 (2002), website last accessed on June 4, 2004.	
BX	P. Shor, "Polynomial-Time Algorithms for Prime Factorization and Discrete Logarithms on a Quantum Computer," <i>SIAM Journal of Computing</i> 26, pp. 1484-1499 (1997)	
BY	D. Vion, A. Aassime, A. Cottet, P. Joyez, H. Pothier, C. Urbina, D. Esteve, and M.H. Devoret, "Manipulating the quantum state of an electrical circuit", <i>Science</i> , 296, pp. 886-889 (2002).	
BZ	C.H. van der Wal, A.C.J. ter Haar, F.K. Wilhelm, R.N. Schouten, C.J.P.M. Harmans, T.P. Orlando, S. Lloyd, and J.E. Mooij, "Quantum superposition of macroscopic persistent-current states", <i>Science</i> , 290, pp. 773-777 (2000).	
CA	Y. Yu, S. Han, X. Chu, S.-I. Chu, and Z. Wang, "Coherent temporal oscillations of macroscopic quantum states in a Josephson junction", <i>Science</i> , 296, pp. 889-892 (2002).	
CB	W.H. Zurek, "Decoherence and the transition from quantum to classical", <i>Physics Today</i> , 44, 10, pp. 36-44 (1991).	
CC	Ulrich Weiss, <i>Quantum Dissipative Systems</i> , 2 nd edition, World Scientific Publishing Co. Pte. Ltd., front page, copyright page, pp. 164-174, 240-251, and 274-380 (1999).	
CD	S. L. Braunstein and H.-K. Lo, eds., <i>Scalable Quantum Computers</i> , Wiley-VCH, front page, copyright page and pp. 1-13 (2001).	
CE	DiVincenzo, D.P., 2000, "The Physical Implementation of Quantum Computation", <i>Fortschritte der Physik</i> 48, pp. 771- 783, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	
CF	Poyatos, J.F., J.I. Cirac, and P. Zoller, 2000, "Schemes of Quantum Computations with Trapped Ions," <i>Fortschritte der Physik</i> 48, pp. 785-799, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	
CG	Grangier, P., G. Reymond, and N. Schlosser, 2000, "Implementations of Quantum Computing Using Cavity Quantum Electrodynamics," <i>Fortschritte der Physik</i> 48, pp. 859-874, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	
CH	Cory, D.G., et al., 2000, "NMR Based Quantum Information Processing: Achievements and Prospects," <i>Fortschritte der Physik</i> 48, pp. 875-907, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	
CI	Burkard, G., H.-A. Engel, and D. Loss, 2000, "Spintronics and Quantum Dots for Quantum Computing and Quantum Communication," <i>Fortschritte der Physik</i> 48, pp. 965-986, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	

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CJ	Kane, B.E., 2000, "Silicon-based Quantum Computation," Fortschritte der Physik 48, pp. 1023-1041, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	
CK	Makhlin, Y., G. Schoen, and A. Shnirman, 2000, "Josephson-Junction Qubits," Fortschritte der Physik 48, pp. 1043-1054, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	
CL	Averin, D.V., 2000, "Quantum Computing and Quantum Measurements with Mesoscopic Josephson Junctions," Fortschritte der Physik 48, pp. 1055-1074, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	
CM	Spiller, T.P., 2000, "Superconducting Circuits for Quantum Computing," Fortschritte der Physik 48, pp. 1075-1094, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	
CN	Dykman, M.I., and P.M. Platzman, 2000, "Quantum Computing Using Electrons Floating on Liquid Helium," Fortschritte der Physik 48, pp. 1095-1108, also published in Braunstein, S. L., and H.-K. Lo (eds.), 2000, <i>Scalable Quantum Computers</i> , Wiley-VCH, Berlin, ISBN 3-527-40321-3.	

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